



## 【特許請求の範囲】

【請求項1】 信号ケーブルの端部に配設されたプラグと接続可能な端子を内部に有するハウジングとを備え、このハウジングに前記信号ケーブルの種類を判別可能なスイッチを取り付けることができるスイッチ装着部を形成したことを特徴とするコネクタ。

【請求項2】 前記スイッチ装着部は、前記ハウジングに嵌入される前記プラグの前面と対峙する側の前記ハウジングの一部に形成した凹部から成ることを特徴とする請求項1記載のコネクタ。

【請求項3】 前記スイッチ装着部は、前記ハウジングに形成した壁で前記スイッチの位置決めをするようにしたことを特徴とする請求項1、または2記載のコネクタ。

【請求項4】 請求項1、または2、または3記載のコネクタを備え、前記信号ケーブルの種類を判別可能なスイッチを前記スイッチ装着部に装着するようにしたことを特徴とするスイッチ付きコネクタ。

【請求項5】 前記スイッチは外壁の一部に係止部を有し、前記ハウジング形成した前記壁には、前記スイッチの前記係止部が係合可能な係合部を形成し、前記係止部を前記係合部に係合させて、前記スイッチ装着部に装着して前記スイッチの動きを規制するようにしたことを特徴とする請求項4記載のスイッチ付きコネクタ。

【請求項6】 前記係止部を凸状に形成し、前記係合部を溝、または孔の凹状に形成し、前記凸状の係止部を前記凹状の係合部にスナップ係合させるようにしたことを特徴とする請求項5記載のスイッチ付きコネクタ。

【請求項7】 棒状の固定部材を備え、前記スイッチ装着部を構成する前記壁と前記スイッチとに前記固定部材を挿通するための貫通孔をそれぞれ形成し、前記スイッチ装着部に前記スイッチを装着した状態で前記それぞれの貫通孔に前記固定部材の一端部を挿通して、この一端部を前記スイッチから突出し、この突出した前記一端部を変形させて、前記スイッチ装着部に装着した前記スイッチの動きを規制するようにしたことを特徴とする請求項4記載のスイッチ付きコネクタ。

【請求項8】 信号ケーブルの端部に配設されたプラグと接続可能な端子を取り付けた絶縁体を内部に有するハウジングとを備え、前記ハウジングを形成する前記絶縁体に、前記信号ケーブルの種類を判別可能なスイッチの操作軸を挿通する貫通孔を形成したことを特徴とするコネクタ。

【請求項9】 請求項8記載のコネクタを備え、前記貫通孔に前記信号ケーブルの種類を判別可能なスイッチの操作軸を挿通した状態で、前記ハウジングに前記スイッチを取り付けるようにしたことを特徴とするスイッチ付きコネクタ。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明はコネクタ、およびスイッチ付きコネクタに係わり、接続されるケーブルの種類を判別可能なコネクタ、およびスイッチ付きコネクタに関する。

【0002】

【従来の技術】従来、コンピュータとデジタル機器、あるいはデジタル機器同士を接続して、データ転送を行うことがある。このようなデータ転送を行うために、コンピュータ等には、レセプタクルとしてのコネクタが例えば後面に配設されており、また、信号ケーブルには、その両端部に配設されたプラグをそれぞれコンピュータ等のコネクタに差し込んで、コンピュータとデジタル機器、あるいはデジタル機器同士を信号ケーブルを介して接続し、データ転送を行うようになっている。

【0003】このような従来のコネクタ1は、図12に示すように、金属等から成り前方が開放された空洞部2aを有するハウジング2が配設され、このハウジング2の空洞部2a内には、前方側に6個の接片3のインサート成型等で取り付けられた絶縁体4が配設されている。前記接片3は、前方の接点部3aが空洞部2a内に露出しており、後方の端子部3bは図示下方に折り曲げられて、図示しないマザー基板等に取り付けることができるようになっている。前記絶縁体4は、ハウジング2の内部の固定部（図示せず）によって固定されて接片3の端子部3bの動きが規制されている。

【0004】前記コネクタ1の空洞部2a内に嵌入されて接片3に接続される従来のプラグは、図示を省略するが、樹脂材料から成る絶縁部材の一方側には信号ケーブルが取り付けられ、他方側の押嵌部には内部にコネクタ1の接片3に接続する接点が配設され、押嵌部の外周部が金属板で覆われて形成されている。ところで、前述のようなコネクタ1は、各種デジタル機器同士において、異なる製造メーカー間でもデータ転送を可能にするためには、データ伝送方式の規格化を図ることが必要とされる。その際、規格においては、プロトコル、例えば転送速度に応じて複数種類の信号ケーブルが用意される場合がある。

【0005】

【発明が解決しようとする課題】しかし、例えば転送速度の応じて複数種類の信号ケーブルが用意された場合には、エンドユーザに混乱を与えるばかりか、誤った信号ケーブルを接続してしまった場合には、転送エラーが発生し良好にデータ伝送をすることができないという問題を引き起こす。そこで本発明は、このような事情に鑑みてなされたものであって、その目的は、上記のような弊害を解決するために信号ケーブルの種類を自動的に判別することができるコネクタを提供することにある。

【0006】

【課題を解決するための手段】前記課題を解決するための第1の解決手段として本発明のコネクタは、信号ケー

ブルの端部に配設されたプラグと接続可能な端子を内部に有するハウジングとを備え、このハウジングに前記信号ケーブルの種類を判別可能なスイッチを取り付けることができるスイッチ装着部を形成した構成とした。

【0007】また、前記課題を解決するための第2の解決手段として本発明のコネクタは、前記スイッチ装着部は、前記ハウジングに嵌入される前記プラグの前面と対峙する側の前記ハウジングの一部に形成した凹部から成る構成とした。

【0008】また、前記課題を解決するための第3の解決手段として本発明のコネクタは、前記スイッチ装着部は、前記ハウジングに形成した壁で前記スイッチの位置決めをするような構成とした。

【0009】また、前記課題を解決するための第4の解決手段として本発明のスイッチ付きコネクタは、請求項1、または2、または3記載のコネクタを備え、前記信号ケーブルの種類を判別可能なスイッチを前記スイッチ装着部に装着するような構成とした。

【0010】また、前記課題を解決するための第5の解決手段として本発明のスイッチ付きコネクタは、前記スイッチは外壁の一部に係止部を有し、前記ハウジング形成した前記壁には、前記スイッチの前記係止部が係合可能な係合部を形成し、前記係止部を前記係合部に係合させて、前記スイッチ装着部に装着して前記スイッチの動きを規制するような構成とした。

【0011】また、前記課題を解決するための第6の解決手段として本発明のスイッチ付きコネクタは、前記記係止部を凸状に形成し、前記係合部を溝、または孔の凹状に形成し、前記凸状の係止部を前記凹状の係合部にスナップ係合させるような構成とした。

【0012】また、前記課題を解決するための第7の解決手段として本発明のスイッチ付きコネクタは、棒状の固定部材を備え、前記スイッチ装着部を構成する前記壁と前記スイッチとに前記固定部材を挿通するための貫通孔をそれぞれ形成し、前記スイッチ装着部に前記スイッチを装着した状態で前記それぞれの貫通孔に前記固定部材の一端部を挿通して、この一端部を前記スイッチから突出し、この突出した前記一端部を変形させて、前記スイッチ装着部に装着した前記スイッチの動きを規制するような構成とした。

【0013】また、前記課題を解決するための第8の解決手段として本発明のコネクタは、信号ケーブルの端部に配設されたプラグと接続可能な端子を取り付けた絶縁体を内部に有するハウジングとを備え、前記ハウジングを形成する前記絶縁体に、前記信号ケーブルの種類を判別可能なスイッチの操作軸を挿通する貫通孔を形成した構成とした。

【0014】また、前記課題を解決するための第9の解決手段として本発明のスイッチ付きコネクタは、請求項8記載のコネクタを備え、前記貫通孔に前記信号ケー

ブルの種類を判別可能なスイッチの操作軸を挿通した状態で、前記ハウジングに前記スイッチを取り付けるような構成とした。

【0015】

【発明の実施の形態】以下に、本発明のコネクタ、およびこのコネクタにスイッチを取り付けたスイッチ付きコネクタの実施の形態について説明する。図1は本発明の第1の実施の形態に係る分解斜視図であり、図2は本発明の第1の実施の形態に係る絶縁体の斜視図であり、図3は本発明の第1の実施の形態に係る斜視図であり、図4は本発明の第2の実施の形態に係る分解斜視図であり、図5は本発明の第3の実施の形態に係るスイッチの斜視図であり、図6は本発明の第4の実施の形態に係る斜視図であり、図7は本発明の第4の実施の形態に係る絶縁体の斜視図であり、図8～図11は本発明に係るプラグの斜視図である。

【0016】本発明の第1の実施の形態のスイッチ付きコネクタ10のコネクタ11は、図1に示すように、外周部が金属板で覆われたハウジング12が配設され、このハウジング12は前方に略矩形で横長の開口部12aを有して内部に空洞部12bが筒状に形成されている。前記開口部12aの図示右側が略台形状に形成された非対称部12cを有し、ハウジング12の左右が非対称になっている。前記非対称部12c側のハウジング12の後方寄りの一部が開放されて凹部12dが形成されている。

【0017】前記ハウジング12の空洞部12b内には、樹脂材料等から成る絶縁体13が所定位置に嵌入されて配設されている。この絶縁体13は、ハウジング12の開口部12aと反対側の後方側に、略直方体の基部13aが形成されて位置し、この基部13aの前側面13gからは、板状の端子取付部13bが突出形成されている。前記前側面13gの図示右側には、第1と第2の壁13d、13eから成る凹部13cが切り欠き形成されている。このような絶縁体13の基部13aを空洞部12b内の所定位置に接着剤等で固着すると、端子取付部13bが空洞部12b内の略中央部に位置した状態で、ハウジング12が構成されている。そして、絶縁体13をハウジング12の空洞部12b内の所定位置に取り付けると、ハウジング12の凹部12bに絶縁体13の凹部13cが位置して、後述する信号ケーブルの種類を判別可能なスイッチ14を装着することができる凹部12dから成るスイッチ装着部が形成されるようになっている。前記凹部12dから成るスイッチ装着部は、上板12eと下板12fの内壁と、絶縁体13の第1と第2の壁13d、13eとから成るハウジング12に形成した壁で構成されている。

【0018】また、絶縁体13の端子取付部13bの上下の面には、例えば合計6個の端子14がインサート成型等で取り付けられて、表面の接点部14aが露出した

状態になっている。そして、端子14は基部13a内に埋設して延長形成され、延長先端のリード部14bが、基部13aの後側面13fから外部に導出され、このリード部14bが図示下方に折り曲げられて、図示しないマザー基板等にリフロー半田付けで面実装ができるようになっている。

【0019】前記スイッチ装着部である凹部12dに装着される、後述するプラグに接続された信号ケーブルの種類を判別可能なスイッチ15は、外形が略矩形的な筐体15aが、前面側に前記ハウジング12の台形状の非対称部12cと同形状の傾斜面15fを有して形成されている。前記筐体15aの内部に、例えば第1と第2の2つのスイッチ（図示せず）が内蔵され、第1のスイッチには操作軸15bが、また第2のスイッチには操作軸15eが、それぞれ筐体15aから突出してスライド可能に軸支されている。そして、第1と第2のスイッチの操作軸15b、15eを軸方向に押圧操作することで、内部の第1と第2の2つのスイッチの回路をON/OFFすることができるようになっている。前記筐体15aの図示右側面に2本のリード部15cが導出され、このリード部15cは、内部の2つのスイッチにそれぞれ接続され、外部に導出された部分は図示下方に折り曲げられている。前記リード部15cは、ハウジング12側のリード部14bと同時に、マザー基板（図示せず）等によりリフロー半田付けで面実装することができるようになっている。

【0020】前述したようなコネクタ11にスイッチ15を取り付けるには、まず、スイッチ15の操作軸15b、15eをハウジング12の凹部12dに挿入する。すると、スイッチ15が斜めになり、この状態からスイッチ15の傾斜面15fをハウジング12の非対称部12cに差し込むことによって、ハウジング12の上部12eと下板12fと、非対称部12cと、第1と第2の壁13d、13eとから成る壁でスイッチ15の位置決めされて、スイッチ装着部である凹部12dにスイッチ15が抜け止めされて装着できるようにになっている。

【0021】このような、コネクタ11にスイッチ15を取り付けた第1の実施の形態のスイッチ付きコネクタ10は、図3に示すように、スイッチ15の筐体15aの前側面15dが、絶縁体13の基部13aの前側面13gと同一平面になり、空洞部12b内に位置する操作軸15b、15eが絶縁体13に取り付けた端子14の方向と平行になって、スイッチ装着部である凹部12dに、スイッチ15を装着することができる。

【0022】また、本発明の第2の実施の形態のスイッチ付きコネクタを、第1の実施の形態で説明した物と異なる部分についてのみ、図4に基づいて説明する。まず、コネクタ21は、ハウジング22に開口部22aを有する空洞部22b内に第1の実施の形態で説明した絶縁体13が取り付けられており、前記ハウジング22の

凹部22dを構成する壁の一部である上板22eと下板22fとから成る壁に、四角形の溝、または孔の凹状に形成した係合部22gが形成されている。図4においては、係合部22gを孔で示している。前記コネクタ21のスイッチ装着部である凹部22dに装着するスイッチ25は、筐体25a内部に、例えば第1と第2の2つのスイッチ（図示せず）が内蔵され、この2つのスイッチからは、それぞれ操作軸25bが突出形成されている。また、筐体25aの図示右側面からは、2つのリード部25cが導出されている。

【0023】前記筐体25aの上面25dと下面25eとは、凸状の係止部25fが突出形成されている。このような本発明の第2の実施の形態のスイッチ付きコネクタ（図示せず）は、スイッチ25をハウジング22の凹部22dに挿入すると、上下の係止部25fが、前記係合部22gにスナップ係合されて、凹部22dに装着したスイッチ25の動きを規制するようになっている。

【0024】また、本発明の第3の実施の形態を図5に基づいて説明すると、スイッチ35は、筐体35a内部に、例えば第1と第2の2つのスイッチ（図示せず）が内蔵され、この2つのスイッチから、それぞれ操作軸35bが突出形成されている。また、筐体35aの図示右側面からは、2つのリード部35cが導出されている。前記筐体35aの2本の操作軸35bに挟まれた部分には、内部の第1と第2の2つのスイッチの回路を切断しないように、略矩形的な貫通孔35eが操作軸35bの軸方向と平行方向に貫通形成されている。この貫通孔35eには、棒状の固定部材36が挿通されるようになっている。前記固定部材36は樹脂材料から成り、一端部36aに所定の幅と深さ寸法の割溝36bが形成され、この固定部材36の他端部36cは一端部36aより幅広に形成されて鉤状になっている。また、第1の実施の形態で説明したハウジング12の壁の一部である絶縁体13の第2の壁13eにも、固定部材36を挿通するための貫通孔（図示せず）が形成されている。

【0025】そして、スイッチ装着部である凹部12dにスイッチ35を装着して状態で、絶縁体13に形成した貫通孔（図示せず）とスイッチ35に形成した貫通孔35eとに固定部材36の一端部36aを挿通して、この一端部36aをスイッチ35の前側面35dから突出し、この前側面35dから突出した一端部36aの割溝36bを、カシメ治具（図示せず）でカシメて変形させ、スイッチ装着部である凹部12dに装着したスイッチ35の動きを規制することができるようになっている。

【0026】また、本発明の第4の実施の形態のスイッチ付きコネクタ40は、図6に示すように、内部に絶縁体43を有するハウジング42が配設され、このハウジング42の後方の外周面にスイッチ45を取り付けた状態になっている。前記ハウジング42の後方の後側面42

gの外側にはスイッチ45を装着可能なスイッチ装着部42fが設けられている。

【0027】また、ハウジング42の空洞部42b内に取付けられた絶縁体43は、図7に示すように、基部43aが矩形状に形成され、端子取付部43bの図示右側の前面43gには、2本の貫通孔43eが前面43gから後面43fにかけて上下に平行に貫通形成されている。また、スイッチ45は、筐体35a内部に、例えば第1と第2の2つスイッチ（図示せず）が内蔵され、この2つのスイッチから、それぞれ操作軸45bが突出形成されている。この2本の操作軸45bは、第1の実施の形態で説明したスイッチ15の操作軸15b、15eより長く形成されている。

【0028】このような構成の第4の実施の形態のスイッチ付きコネクタ40は、ハウジング42の後側面42g側から、絶縁体43の2つの貫通孔43eに、スイッチ45の2本の操作軸45bをスライド可能に挿通した状態で、スイッチ45をスイッチ装着部42fに接着剤等で取り付ける。すると、2本の操作軸45bの先端部が、ハウジング45内部の絶縁体43の前面43gから所定寸法前方側に突出した状態で、第4の実施の形態のスイッチ付きコネクタ40が構成されている。

【0029】前述のような、本発明の第1から第4の実施の形態のスイッチ付きコネクタに接続するプラグは、データ転送の効率をよくするために、最高データ転送速度に対応して、例えば信号ケーブルの長さが異なり、この信号ケーブルの一番長い方から順番に第1から第4の4種類のプラグを準備している。この第1から第4の4種類のプラグについて、図8～図11に基づいて説明する。

【0030】まず、図8に示すように、信号ケーブル16bの端部に配設された第1のプラグ16は、樹脂材料からなる絶縁部材16aを有し、この絶縁部材16aの一方側に、例えば4種類のプラグの中で1番長い信号ケーブル16bが接続されている。前記絶縁部材16aの他方側の押嵌部16cの前面壁16dには、コネクタ1の端子14の接点部14aに接続する、内部に接点（図示せず）を有する開口部16eが所定の大きさと深さで形成され、押嵌部16cの外周部が金属板16fで覆われている。この金属板16fは第1のプラグ16をコネクタ11に嵌入して接続すると、金属性のハウジング12の接片（図示せず）が接触して導通するようになっている。前記押嵌部16cは、例えば第1の実施の形態のコネクタ11にプラグ16を嵌入するときの誤嵌入するのを防止するために、前面壁16dの図示左側がハウジング12の非対称部12cと同形状の略台形状に形成されている。

【0031】このような構成の第1のプラグ16は、押嵌部16cの前面壁16dが段差のない平坦状に形成されているので、プラグ16を、例えば第1の実施の形態

のコネクタ11に嵌入して接続すると、図示左側の台形状の前面壁16dがスイッチ15の第1と第2のスイッチの操作軸15b、15eを押し、第1と第2のスイッチを同時にONするようになっている。前記スイッチ15の第1と第2のスイッチ（図示せず）がONすることで、例えばプリンタ等の装置側の制御部（図示せず）が、1番長い信号ケーブルを有する第1のプラグ16がコネクタ11に接続されたことを自動的に検知するようになっている。

【0032】また、図9に示すように、信号ケーブル17bの端部に配設された第2のプラグ17は、絶縁部材17aの一方側に、例えば4種類のプラグの中で2番目に長い信号ケーブル17bが接続され、他方側の押嵌部17cの前面壁17dには、開口部17eが形成され、押嵌部17cの外周部が金属板17fで覆われている。前記押嵌部17cの前面壁17dの図示左側の台形状のコーナ部の上側半分が、所定寸法で切り欠きされて切り欠き部17gが形成されている。

【0033】そのために、第2のプラグ17を、例えば第1の実施の形態のコネクタ11に嵌入して接続すると、前記切り欠き部17gにスイッチ15の第1のスイッチの操作軸15bが位置して操作軸15bは押し込まれず、第2スイッチの操作軸15eだけが前面壁17dで押し込まれて、第2スイッチだけがONする。この第2のスイッチがONすることで、装置側の制御部（図示せず）が、2番目に長い信号ケーブルを有する第2のプラグ17が、コネクタ11に接続されたことを自動的に検知するようになっている。

【0034】また、図10に示すように、信号ケーブル18bの端部に配設された第3のプラグ18は、絶縁部材18aの一方側に、例えば4種類のプラグの中で3番目に長い信号ケーブル18bが接続され、他方側の押嵌部18cの前面壁18dには、開口部18eが形成され、押嵌部18cの外周部が金属板18fで覆われている。前記押嵌部18cの前面壁18dの図示左側の台形状のコーナ部の下側半分が、所定寸法で切り欠きされて切り欠き部18gが形成されている。

【0035】そのために、第3のプラグ18を、例えば第1の実施の形態のコネクタ11に嵌入して接続すると、前記切り欠き部18gにスイッチ15の第2のスイッチの操作軸15eが位置して操作軸15eは押し込まれず、第1のスイッチの操作軸15bが前面壁18dで押し込まれて、第1のスイッチだけがONする。この第1のスイッチがONすることで、装置側の制御部（図示せず）が、3番目に長い信号ケーブルを有する第3のプラグ18がコネクタ11に接続されたことを自動的に検知するようになっている。

【0036】また、図11に示すように、信号ケーブル19bの端部に配設された第4のプラグ19は、絶縁部材19aの一方側に、例えば4種類のプラグの中で4番

目に長い(4種類の中では一番短い)信号ケーブル19bが接続され、他方側の押嵌部19cの前面壁19dには、開口部19eが形成され、押嵌部19cの外周部が金属板19fで覆われている。前記押嵌部19cの前面壁19dの図示左側の台形状のコーナ部が、図示上下に切り欠きされて切り欠き部19gが形成されている。

【0037】そのために、第4のプラグ19を、例えば第1の実施形態のコネクタ11に嵌入して接続すると、前記切り欠き部19gにスイッチ15の第1と第2のスイッチの操作軸15b、15eが位置して、2つの操作軸15b、15eは押圧されないで、第1と第2のスイッチがONされない。前記第4のプラグ19がコネクタ11に嵌入されて接続されたのに、第1と第2の2つ

のスイッチがONされないことで、装置側の制御部(図示せず)が、4番目に長い(4種類の中では一番短い)信号ケーブル19bを有するプラグ19がコネクタ11に接続されたことを自動的に検知することができるようになっている。

【0038】前述したような第1〜第4の4種類のプラグとスイッチ15の第1と第2のスイッチの動作と信号ケーブルの最高データ転送速度との関係を表1に示す。この例では、第1〜第4のプラグの順に信号ケーブルの長さが短くなって、データ転送速度が早くなるようになっている。

【表1】

	第1のSW	第2のSW	信号ケーブルの種類	
			長さ	最高データ転送速度
第1のプラグ	ON	ON	1番	400Mbps
第2のプラグ	OFF	ON	2番	800Mbps
第3のプラグ	ON	OFF	3番	1600Mbps
第4のプラグ	OFF	OFF	4番	3200Mbps

【0039】本発明の第1〜第3の実施形態の説明では、スイッチ装着である凹部を、ハウジングの上板と下板と、ハウジング12の対称部12cと、絶縁体形成した2つの壁とから成る、ハウジングに形成した壁で構成した物で説明したが、絶縁体形成した2つの壁を、金属板から成るハウジングを切り曲げ等によって形成した壁で、凹部を形成した物でもよい。また、本発明のスイッチ付きコネクタに用いるスイッチを、第1と第2の2つのスイッチを内蔵した物で説明したが、信号ケーブルの種類に対応して、内蔵するスイッチの数を変更したものでよい。また、第1と第2のスイッチは直体内に内蔵した物に限定されず、それぞれバラ状の単品のスイッチを、スイッチ装着部に装着したものでよい。

【0040】

【発明の効果】本発明のコネクタは、信号ケーブルの端部に配設されたプラグと接続可能な端子を内部に有するハウジングを備え、このハウジングに前記信号ケーブルの種類を判別可能なスイッチを取り付けることができるスイッチ装着部を形成したので、このスイッチ装着部に容易にスイッチを装着することができる組立性のよいコネクタを提供することができる。

【0041】また、本発明のコネクタの前記スイッチ装着部は、前記ハウジングに嵌入される前記プラグの前面と対峙する側の前記ハウジングの一部に形成した凹部から成るので、ハウジングをプレス加工等で、また内部の絶縁体を成型加工等で容易に凹部を形成することができる。加工の容易なコネクタを提供することができる。

【0042】また、本発明のコネクタの前記スイッチ装着部は、前記ハウジングに形成した壁で前記スイッチの

位置決めをするようにしたので、凹部から成るスイッチ装着部に取り付けるスイッチの位置決め精度を高くすることができる。

【0043】また、本発明のスイッチ付きコネクタは、請求項1、または2、または3記載のコネクタを備え、前記信号ケーブルの種類を判別可能なスイッチを前記スイッチ装着部に装着するようにしたので、スイッチ装着部に装着したスイッチで信号ケーブルの種類を自動的に判別して検知ことができ、信号ケーブルの種類を間違いなく確実に判別することができるスイッチ付きコネクタを提供できる。また、スイッチ装着部に容易にスイッチを装着することができると共に、スイッチ装着部に取り付けたスイッチの位置決め精度を高くすることができる。

【0044】また、本発明のスイッチ付きコネクタに取り付ける前記スイッチは、外壁の一部に係止部を有し、前記ハウジング形成した前記壁には、前記スイッチの前記係止部が係合可能な係合部を形成し、前記係止部を前記係合部に係合させて、前記スイッチ装着部に装着して前記スイッチの動きを規制するようにしたので、スイッチを確実にコネクタに係止して固定することができる。スイッチに係止したコネクタに振動等が加わったとしても、スイッチが外れたりすることのないスイッチ付きコネクタを提供することができる。

【0045】また、本発明のスイッチ付きコネクタは、前記係止部を凸状に形成し、前記係合部を溝、または孔の凹状に形成し、前記凸状の係止部を前記凹状の係合部にスナップ係合させるようにしたので、手作業等でスイッチをワンタッチで容易にコネクタに係止して固定する

ことができ、組立性のよいスイッチ付きコネクタを提供できる。

【0046】また、本発明のスイッチ付きコネクタは、棒状の固定部材を備え、前記スイッチ装着部を構成する前記壁と前記スイッチとに前記固定部材を挿通するための貫通孔をそれぞれ形成し、前記スイッチ装着部に前記スイッチを装着した状態で前記それぞれの貫通孔に前記固定部材の一端部を挿通して、この一端部を前記スイッチから突出し、この突出した前記一端部を変形させて、前記スイッチ装着部に装着した前記スイッチの動きを規制するようにしたので、更に確実にスイッチをコネクタに係止して固定することができる。

【0047】また、本発明のコネクタは、信号ケーブルの端部に配設されたプラグと接続可能な端子を取り付けた絶縁体を内部に有するハウジングを備え、前記ハウジングを形成する前記絶縁体に、前記信号ケーブルの種類を判別可能なスイッチの操作軸を挿通する貫通孔を形成したので、この貫通孔にスイッチの操作軸を挿通することで、スイッチをハウジングに装着することができるコネクタを提供することができる。

【0048】また、本発明のスイッチ付きコネクタは、請求項8記載のコネクタを備え、前記貫通孔に前記信号ケーブルの種類を判別可能なスイッチの操作軸を挿通した状態で、前記ハウジングに前記スイッチを取り付けるようにしたので、組立性のよいスイッチ付きコネクタを提供することができる。

#### 【図面の簡単な説明】

【図1】本発明の第1の実施の形態に係わる分解斜視図である。

【図2】本発明の第1の実施の形態に係わる絶縁体の斜視図である。

【図3】本発明の第1の実施の形態に係わる斜視図である。

【図4】本発明の第2の実施の形態に係わる分解斜視図である。

【図5】本発明の第3の実施の形態に係わるスイッチと固定部材の斜視図である。

【図6】本発明の第4の実施の形態に係わる斜視図である。

【図7】本発明の第4の実施の形態に係わる絶縁体の斜視図である。

【図8】本発明に係わる第1のプラグの斜視図である。

【図9】本発明に係わる第2のプラグの斜視図である。

【図10】本発明に係わる第3のプラグの斜視図である。

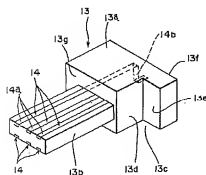
【図11】本発明に係わる第4のプラグの斜視図である。

【図12】従来のコネクタの要部斜視図である。

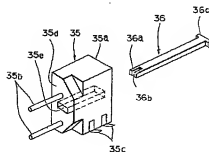
#### 【符号の説明】

- 10 第1の実施の形態のスイッチ付きコネクタ
- 11 コネクタ
- 12 ハウジング
- 12a 開口部
- 12b 空洞部
- 12c 非対称部
- 12d 凹部
- 12e 上板
- 12f 下板
- 13 絶縁体
- 13a 基部
- 13b 端子取付部
- 13c 凹部
- 13d 第1の壁
- 13e 第2の壁
- 13f 後側面
- 13g 前側面
- 14 端子
- 14a 接点部
- 14b リード部
- 15 スイッチ
- 15a 筐体
- 15b 操作軸
- 15c リード部
- 15d 前側面

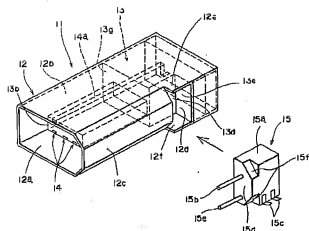
【図2】



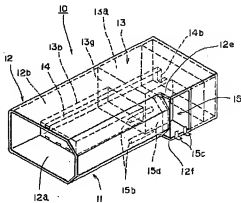
【図5】



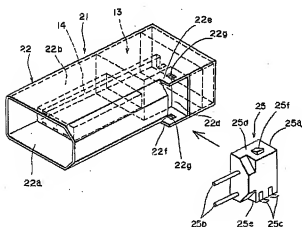
【図1】



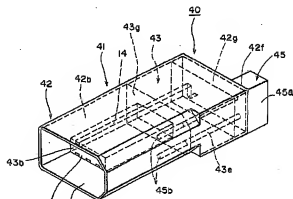
【図3】



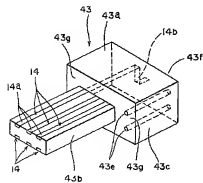
【図4】



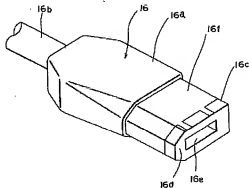
【図6】



【図7】

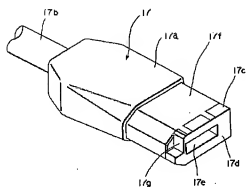


【図8】

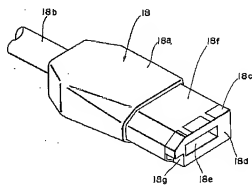




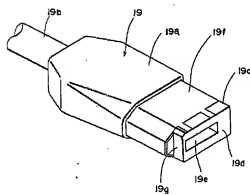
【図9】



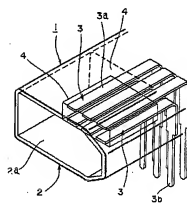
【図10】



【図11】



【図12】



# PATENT ABSTRACTS OF JAPAN

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(72)Inventor : SAITO KYOZO

AZUMA TORU

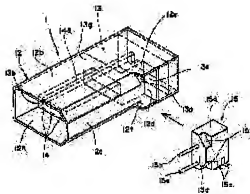
NINOMIYA NOBUYUKI

(54) CONNECTOR AND CONNECTOR HAVING SWITCH ATTACHED THEREWITH

(57)Abstract:

**PROBLEM TO BE SOLVED:** To automatically judge a type of a signal cable by providing an end of the signal cable with a plug and a housing having a connectable terminal inside, forming a switch mounting portion in the housing, and mounting the switch capable of judging the type of the signal cable.

**SOLUTION:** A switch mounting portion comprising a recess 12d provided with a switch 15 capable of judging a type of a signal cable at a rear part of an asymmetric portion 12c of a housing 12 of a connector 11. The switch 15 can turn on/off inner first and second switches by axially pressing operation shafts 15b, 15e. For mounting the switch 15 to the connector 11, the operation shafts 15b, 15e of the switch 15 are inserted into the recess 12d of the housing 12, and then, a tilting surface 15f of the switch 15 is inserted into the asymmetric portion 12c of the housing 12. Thus, the switch 15 can be mounted to the recess 12d, the switch mounting portion.



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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the connector which can distinguish a kind and the connector with a switch of the cable connected with respect to a connector and a connector with a switch.

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[Translation done.]

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## PRIOR ART

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[Description of the Prior Art]Conventionally, a computer, a digital instrument, or digital instruments may be connected, and data transfer may be performed. In order to perform such data transfer, to a computer. It is allocated in the rear face by the connector as a receptacle, and to a signal cable. The plug allocated in the both ends is inserted in connectors, such as a computer, respectively, a computer, a digital instrument, or digital instruments are connected via a signal cable, and data transfer is performed.

[0003]As such a conventional connector 1 is shown in drawing 12, the housing 2 which has the hollow part 2a which comprises metal etc., and by which the front was opened wide is allocated, and the insulator 4 attached to front sides by insertion molding of the six contact pieces 3 etc. is allocated in the hollow part 2a of this housing 2. The front contact surface 3a has exposed said contact piece 3 in the hollow part 2a.

The back terminal area 3b can be bent by the graphic display lower part, and can be attached now to the mother board etc. which are not illustrated.

Said insulator 4 is fixed by the holding part inside the housing 2 (not shown), and the motion of the terminal area 3b of the contact piece 3 is regulated.

[0004]Although the conventional plug which is inserted in the hollow part 2a of said connector 1, and is connected to the contact piece 3 omits a graphic display, A signal cable is attached to the one side of the insulating member which comprises a resin material, the point of contact which connects with the contact piece 3 of the connector 1 inside is allocated in the insertion section of the other side, and the peripheral part of the insertion section is covered and formed with the metal plate. By the way, in order for the above connectors 1 to make data transfer possible also among different manufacturing makers in various digital equipment, to attain standardization of data transmission systems is needed. In that case, two or more kinds of signal cables may be prepared in a standard according to a protocol, for example, a transfer rate.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, when giving confusion to an end user when a transfer rate's responds, for example and two or more kinds of signal cables are prepared, and the mistaken signal cable has been connected, a transfer error occurs and the problem that data communications cannot be carried out good is caused. Then, this invention is made in view of such a situation, and the purpose is to provide the connector which can distinguish the kind of signal cable automatically, in order to solve the above evils.

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[Translation done.]

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MEANS

[Means for Solving the Problem]As the 1st solving means for solving said technical problem, a connector of this invention, It had a plug allocated by end of a signal cable, and housing which has a connectable terminal inside, and had composition in which a switch applied part which can attach to this housing a switch which can distinguish a kind of said signal cable was formed.

[0007]Said switch applied part considered a connector of this invention as composition which comprises a crevice formed in said some of housing of a side which stands face to face against a front face of said plug inserted in said housing as the 2nd solving means for solving said technical problem.

[0008]Said switch applied part considered a connector of this invention as composition which positions said switch with a wall formed in said housing as the 3rd solving means for solving said technical problem.

[0009]As the 4th solving means for solving said technical problem, a connector with a switch of this invention was provided with a connector claim 1 or 2 or given in three, and considered it as composition which equips said switch applied part with a switch which can distinguish a kind of said signal cable.

[0010]As the 5th solving means for solving said technical problem, a connector with a switch of this invention, Said switch had a suspending portion in some outer walls, it formed an engagement part with which said suspending portion of said switch can engage, made said suspending portion engage with said engagement part, and was used as said said wall which carried out housing formation with composition which equips said switch applied part and regulates movement toward said switch.

[0011]As the 6th solving means for solving said technical problem, a connector with a switch of this invention formed said account suspending portion in convex, formed said engagement part in a concave of a slot or a hole, and considered it as composition which makes said concave

engagement part carry out snap engagement of said convex suspending portion.

[0012]As the 7th solving means for solving said technical problem, a connector with a switch of this invention, Have a cylindrical holddown member and a breakthrough for inserting said holddown member in said wall which constitutes said switch applied part, and said switch is formed, respectively, Where said switch applied part is equipped with said switch, an end part of said holddown member was inserted in said each breakthrough, this end part was projected from said switch, said this projected end part was changed, and it had composition which regulates movement toward said switch with which said switch applied part was equipped.

[0013]As the 8th solving means for solving said technical problem, a connector of this invention, It had a plug allocated by end of a signal cable, and housing which has the insulator which attached a connectable terminal inside, and had composition in which a breakthrough which inserts in an operating shaft of a switch which can distinguish a kind of said signal cable to said insulator which forms said housing was formed.

[0014]As the 9th solving means for solving said technical problem, a connector with a switch of this invention, It had the connector according to claim 8, and where an operating shaft of a switch which can distinguish a kind of said signal cable is inserted in said breakthrough, it had composition which attaches said switch to said housing.

[0015]

[Embodiment of the Invention]The embodiment of a connector with a switch which attached the connector of this invention to below and attached the switch to this connector is described.

Drawing 1 is an exploded perspective view concerning a 1st embodiment of this invention, and drawing 2 is a perspective view of the insulator concerning a 1st embodiment of this invention, Drawing 3 is a perspective view concerning a 1st embodiment of this invention, and drawing 4 is an exploded perspective view concerning a 2nd embodiment of this invention, It is a perspective view of the switch concerning a 3rd embodiment of drawing 5 this invention, drawing 6 is a perspective view concerning a 4th embodiment of this invention, drawing 7 is a perspective view of the insulator concerning a 4th embodiment of this invention, and drawing 8 - drawing 11 are the perspective views of the plug concerning this invention.

[0016]As the connector 11 of the connector 10 with a switch of a 1st embodiment of this invention is shown in drawing 1, the housing 12 with which the peripheral part was covered with the metal plate is allocated, this housing 12 has the oblong opening 12a with an approximately rectangle ahead, and the hollow part 12b is formed in the inside tubed. The graphic display right-hand side of said opening 12a has the unsymmetrical part 12c formed in the approximately trapezoidal shape, and the right and left of the housing 12 are unsymmetrical. A part of back slippage of the housing 12 by the side of said unsymmetrical part 12c is opened wide, and the crevice 12d is formed.

[0017]In the hollow part 12b of said housing 12, the insulator 13 which comprises a resin



material etc. is inserted in a prescribed position, and is allocated. The base 13a of an abbreviated rectangular parallelepiped is formed in the opening [ of the housing 12 ] 12a, and back side of an opposite hand, this insulator 13 is located, and formed protruding of the tabular terminal mounting part 13b is carried out from 13g of front side faces of this base 13a. On the right-hand side of [ graphic display ] said 13 g of front side faces, notching formation of the crevice 13c which comprises the 1st and the 2nd wall 13d and 13e is carried out. If the base 13a of such an insulator 13 is adhered to the prescribed position in the hollow part 12b with adhesives etc., the housing 12 is constituted where the terminal mounting part 13b is located in the approximately center part in the hollow part 12b. And if the insulator 13 is attached to the prescribed position in the hollow part 12b of the housing 12, The switch applied part to which the crevice 13c of the insulator 13 changes from the crevice 12d which can equip with the switch 14 which is located and can distinguish the kind of signal cable mentioned later is formed in the crevice 12b of the housing 12. The switch applied part which comprises said crevice 12d comprises a wall formed in the housing 12 which comprises the wall of the superior lamella 12e and 12 f of inferior lamellas, and the 1st and the 2nd wall 13d and 13e of the insulator 13.

[0018]A total of six terminals 14 are attached to the field of the upper and lower sides of the terminal mounting part 13b of the insulator 13 by insertion molding etc., for example, and the surface contact surface 14a will be exposed. And as for the terminal 14, it lays underground in the base 13a, extended formation is carried out, the lead part 14b at an extended tip is drawn from 13f of rear flanks of the base 13a outside, this lead part 14b is bent by the graphic display lower part, and surface mounting has come be made in reflow soldering at the mother board etc. which are not illustrated.

[0019]In an outside, the housing 15a of an approximately rectangle has the unsymmetrical part 12c of the trapezoidal shape of said housing 12, and 15 f of isomorphism-like inclined planes in the front-face side, and the switch 15 which can distinguish the kind of signal cable with which the crevice 12d which is said switch applied part is equipped, and which was connected to the plug mentioned later is formed. Two switches (not shown), the 1st and the 2nd, are built in the inside of said housing 15a, for example, the operating shaft 15b can swerve to the 1st switch, and the operating shaft 15e can swerve to the 2nd switch, and it projects from the \*\*\*\* housing 15a, and is supported pivotally so that a slide is possible. And the 1st of an inside and the circuit of the 2nd two switch can be turned on and off now by carrying out pressing operation of the operating shafts 15b and 15e of the 2nd switch to the 1st in shaft orientations. The two lead parts 15c are drawn by the graphic display right lateral of said housing 15a, it is connected to two internal switches, respectively, this lead part 15c is, and the portion drawn outside is bent by the graphic display lower part. Simultaneously with the lead part 14b by the side of the housing 12, surface mounting of said lead part 15c can be carried out now to a

mother board (not shown) etc. by reflow soldering.

[0020]In order to attach the switch 15 to the connector 11 which was mentioned above, the operating shafts 15b and 15e of the switch 15 are first inserted in the crevice 12d of the housing 12. Then, when the switch 15 becomes slanting and inserts 15 f of inclined planes of the switch 15 in the unsymmetrical part 12c of the housing 12 from this state, With the wall which comprises the superior lamella 12e of the housing 12, 12 f of inferior lamellas, the unsymmetrical part 12c, and the 1st and the 2nd wall 13d and 13e, the switch 15 is positioned, the slip off stop of the switch 15 is carried out to the crevice 12d which is a switch applied part, and it can be equipped now.

[0021]Such a connector 10 with a switch of a 1st embodiment that attached the switch 15 to the connector 11, As shown in drawing 3, 15 d of front side faces of the housing 15a of the switch 15 turn into the same flat surface as 13 g of front side faces of the base 13a of the insulator 13, The operating shafts 15b and 15e located in the hollow part 12b become the direction of the terminal 14 attached to the insulator 13, and parallel, and the crevice 12d which is a switch applied part can be equipped with the switch 15.

[0022]The connector with a switch of a 2nd embodiment of this invention is explained only about a different portion from the thing explained by a 1st embodiment based on drawing 4. First, the insulator 13 explained by a 1st embodiment is attached in the hollow part 22b to which the connector 21 has the opening 22a in the housing 22. The slot on square or the engagement part 22g formed in the concave of a hole is formed in the wall which comprises the superior lamella 22e which are some walls which constitute the crevice 22d of said housing 22, and 22 f of inferior lamellas. In drawing 4, the hole shows the engagement part 22g. Two switches (not shown), the 1st and the 2nd, are built in, for example, and, as for the switch 25 with which the crevice 22d which is a switch applied part of said connector 21 is equipped, formed protruding of the operating shaft 25b is carried out to the inside of housing 25a from these two switches, respectively. The two lead parts 25c are drawn from the graphic display right side of the housing 25a.

[0023]Formed protruding of the convex suspending portion 25f is carried out to 25 d of upper surfaces and the undersurface 25e of said housing 25a. Such a connector with a switch of a 2nd embodiment of this invention (not shown), If the switch 25 is inserted in the crevice 22d of the housing 22, snap engagement will be carried out at said engagement part 22g, and the up-and-down suspending portion 25f will regulate the movement toward the switch 25 with which the crevice 22d was equipped.

[0024]If a 3rd embodiment of this invention is described based on drawing 5, 1st and 2nd 2 switch (not shown) is built in, for example, and, as for the switch 35, formed protruding of the operating shaft 35b is carried out to the inside of housing 35a from these two switches, respectively. The two lead parts 35c are drawn from the graphic display right side of the

housing 35a. Penetration formation of the breakthrough 35e of an approximately rectangle is carried out at the shaft orientations and the parallel direction of the operating shaft 35b so that the circuit of the internal 1st and the 2nd switch may not be cut into the portion pinched by the two operating shafts 35b of said housing 35a. The cylindrical holddown member 36 is inserted in this breakthrough 35e. said holddown member 36 comprises a resin material, predetermined width and the groove 36b of a depth dimension are formed in the end part 36a, and the other end 36c of this holddown member 36 is formed more broadly than the end part 36a -- a collar - it is \*\*. The breakthrough (not shown) for inserting the holddown member 36 also in the 2nd wall 13e of the insulator 13 which are some walls of the housing 12 explained by a 1st embodiment is formed.

[0025] And equip with the switch 35 the crevice 12d which is a switch applied part, and in the state. The end part 36a of the holddown member 36 is inserted in the breakthrough (not shown) formed in the insulator 13, and the breakthrough 35e formed in the switch 35. The groove 36b of the end part 36a which projected this end part 36a from 35d of front side faces of the switch 35, and was projected from 35d of this front side face, It can be made to crimp and change with a caulking jig (not shown), and the movement toward the switch 35 with which the crevice 12d which is a switch applied part was equipped can be regulated now.

[0026] As shown in drawing 6, the housing 42 which has the insulator 43 inside is allocated, and the switch 45 will be attached the connector 40 with a switch of a 4th embodiment of this invention to the outside behind this housing 42. The switch applied part 42f which can equip with the switch 45 is formed in the outside of 42 g of rear flanks behind said housing 42.

[0027] As shown in drawing 7, the base 43a is formed in a rectangle, the two breakthroughs 43e apply the insulator 43 attached in the hollow part 42b of the housing 42 from 43g of front side faces to 43 f of rear flanks, and penetration formation is carried out in parallel up and down at 43g of front side faces on the right-hand side of [ graphic display ] the terminal mounting part 43b. 1st and 2nd 2 switch (not shown) is built in, for example, and, as for the switch 45, formed protruding of the operating shaft 45b is carried out to the inside of housing 35a from these two switches, respectively. These two operating shafts 45b are formed for a long time than the operating shafts 15b and 15e of the switch 15 explained by a 1st embodiment.

[0028] Such a connector 40 with a switch of a 4th embodiment of composition, Where the two operating shafts 45b of the switch 45 are inserted in the two breakthroughs 43e of the insulator 43 from the rear flank 42g side of the housing 42 so that a slide is possible, the switch 45 is attached to the switch applied part 42f with adhesives etc. Then, after the tip part of the two operating shafts 45b has projected to prescribed dimension front sides from 43g of front side faces of the insulator 43 of housing 45 inside, the connector 40 with a switch of a 4th embodiment is constituted.

[0029]The plug linked to the connector with a switch of the 1st to 4th above embodiment of this invention, In order to receive the efficiency of data transfer, corresponding to the highest data transfer rate, the length of a signal cable differs and the 1st to 4th four kinds of plug is prepared in an order from the longer one of this signal cable. The 1st to 4th four kinds of this plug is explained based on drawing 8 - drawing 11.

[0030]First, as shown in drawing 8, the 1st plug 16 allocated by the end of the signal cable 16b has the insulating member 16a which comprises a resin material, and the signal cable 16b long No. 1 is connected to the one side of this insulating member 16a, for example in four kinds of plugs. The opening 16e linked to the contact surface 14a of the terminal 14 of the connector 11 which has a point of contact (not shown) inside is formed in the front wall 16d of the insertion section 16c of the other side of said insulating member 16a in a predetermined size and depth, and the peripheral part of the insertion section 16c is covered with it with the metal plate 16f. If this metal plate 16f inserts the 1st plug 16 in the connector 11 and connects, the contact segment (not shown) of the metallic housing 12 will contact, and it will flow. In order to prevent incorrect-inserting said insertion section 16c when inserting the plug 16 in the connector 11 of a 1st embodiment, for example, the graphic display left-hand side of the front wall 16d is formed in the unsymmetrical part 12c of the housing 12, and the isomorphism-like approximately trapezoidal shape.

[0031]Since the front wall 16d of the insertion section 16c is formed in the shape of [ without a level difference ] flatness, the 1st plug 16 of such composition, If the plug 16 is inserted in the connector 11 of a 1st embodiment, for example and it connects, 16 d of front side faces of the trapezoidal shape on the left-hand side of a graphic display press the 1st of the switch 15, and the operating shafts 15b and 15e of the 2nd switch, and turn on the 1st and the 2nd switch simultaneously. It detects automatically that the 1st plug 16 to which the control section (not shown) by the side of devices, such as a printer, has a signal cable long No. 1, for example was connected to the connector 11 because the 1st of said switch 15 and the 2nd switch (not shown) turn on.

[0032]The 2nd plug 17 allocated by the end of the signal cable 17b as shown in drawing 9, The long signal cable 17b is connected to the 2nd, for example in four kinds of plugs, the opening 17e is formed and the peripheral part of the insertion section 17c is covered with the front wall 17d of the insertion section 17c of the other side with the metal plate 17f at the one side of the insulating member 17a. Notching of the upper part half of the corner part of the trapezoidal shape on the left-hand side of [ graphic display ] the front wall 17d of said insertion section 17c is carried out with a prescribed dimension, and the notch section 17g is formed.

[0033]Therefore, if the 2nd plug 17 is inserted in the connector 11 of a 1st embodiment, for example and it connects, The operating shaft 15b of the 1st switch of the switch 15 is located in said notch section 17g, it is not pressed, but only the operating shaft 15e of the 2nd switch is

pressed with the front wall 17d, and only the 2nd switch turns on the operating shaft 15b. The 2nd plug 17 to which the control section (not shown) by the side of a device has a long signal cable in the 2nd detects having been connected to the connector 11 automatically because this 2nd switch turns on.

[0034]The 3rd plug 18 allocated by the end of the signal cable 18b as shown in drawing 10, The long signal cable 18b is connected to the 3rd, for example in four kinds of plugs, the opening 18e is formed and the peripheral part of the insertion section 18c is covered with the front wall 18d of the insertion section 18c of the other side with the metal plate 18f at the one side of the insulating member 18a. Notching of the bottom half of the corner part of the trapezoidal shape on the left-hand side of [ graphic display ] 18 d of front side faces of said insertion section 18c is carried out with a prescribed dimension, and the notch section 18g is formed.

[0035]Therefore, if the 3rd plug 18 is inserted in the connector 11 of a 1st embodiment, for example and it connects, The operating shaft 15e of the 2nd switch of the switch 15 is located in said notch section 18g, it is not pressed, but the operating shaft 15b of the 1st switch is pressed with the front wall 18d, and only the 1st switch turns on the operating shaft 15e. It detects automatically that the 3rd plug 18 to which the control section (not shown) by the side of a device has a long signal cable in the 3rd was connected to the connector 11 because this 1st switch turns on.

[0036]The 4th plug 19 allocated by the end of the signal cable 19b as shown in drawing 11, The long (the shortest in four kinds) signal cable 19b is connected to the 4th, for example in four kinds of plugs, the opening 19e is formed and the peripheral part of the insertion section 19c is covered with the front wall 19d of the insertion section 19c of the other side with the metal plate 19f at the one side of the insulating member 19a. Notching of the corner part of the trapezoidal shape on the left-hand side of [ graphic display ] the front wall 19d of said insertion section 19c is carried out to the graphic display upper and lower sides, and the notch section 19g is formed.

[0037]Therefore, if the 4th plug 19 is inserted in the connector 11 of a 1st embodiment, for example and it connects, The 1st and the 2nd switch are not turned on without locating the operating shafts 15b and 15e of the 1st and the 2nd SWITCH of the switch 15 in said notch section 19g and pressing the two operating shafts 15b and 15e. By two switches, the 1st and the 2nd, not being turned on although said 4th plug 19 was inserted and connected to the connector 11. It can detect now automatically that the plug 19 to which the control section (not shown) by the side of a device has the long (the shortest in four kinds) signal cable 19b in the 4th was connected to the connector 11.

[0038]the [ the 1st which was mentioned above - ] -- the relation between four kinds of plugs of four, the 1st of the switch 15, operation of the 2nd switch, and the highest data transfer rate of

a signal cable is shown in Table 1. In this example, the length of a signal cable becomes short at the order of the 1st - the 4th plug, and a data transfer rate becomes early.

[Table 1]

	第1のSW	第2のSW	信号ケーブルの種類	
			長さ	最高データ転送速度
第1のプラグ	ON	ON	1番	400Mbps
第2のプラグ	OFF	ON	2番	800Mbps
第3のプラグ	ON	OFF	3番	1600Mbps
第4のプラグ	OFF	OFF	4番	3200Mbps

[0039]Although the thing constituted from a wall which comprises the superior lamella of housing, an inferior lamella, the unsymmetrical part 12c of the housing 12, and two walls formed in the insulator, and which was formed in housing explained the crevice which is switch wearing in explanation of the 1st - a 3rd embodiment of this invention, The thing which formed the crevice with the wall which formed the housing which comprises a metal plate in two walls formed in the insulator by end bending etc. may be sufficient. Although the thing having two switches, the 1st and the 2nd, explained the switch used for the connector with a switch of this invention, corresponding to the kind of signal cable, what changed the number of the switches to build in may be used. The 1st and the 2nd switch may not be limited to the thing built in the housing, but what equipped the switch applied part with the switch of the Bala-like item may be used for them, respectively.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is an exploded perspective view concerning a 1st embodiment of this invention.

[Drawing 2] It is a perspective view of the insulator concerning a 1st embodiment of this invention.

[Drawing 3] It is a perspective view concerning a 1st embodiment of this invention.

[Drawing 4] It is an exploded perspective view concerning a 2nd embodiment of this invention.

[Drawing 5] It is a perspective view of a switch and a holddown member concerning a 3rd embodiment of this invention.

[Drawing 6] It is a perspective view concerning a 4th embodiment of this invention.

[Drawing 7] It is a perspective view of the insulator concerning a 4th embodiment of this invention.

[Drawing 8] It is a perspective view of the 1st plug concerning this invention.

[Drawing 9] It is a perspective view of the 2nd plug concerning this invention.

[Drawing 10] It is a perspective view of the 3rd plug concerning this invention.

[Drawing 11] It is a perspective view of the 4th plug concerning this invention.

[Drawing 12] It is an important section perspective view of the conventional connector.

[Description of Notations]

10 The connector with a switch of a 1st embodiment

11 Connector

12 Housing

12a Opening

12b Hollow part

12c Unsymmetrical part

12 d Crevice

12e Superior lamella

12 f Inferior lamella  
13 Insulator  
13a Base  
13b Terminal mounting part  
13c Crevice  
13 d The 1st wall  
13e The 2nd wall  
13 f Rear flank  
13 g Front side face  
14 Terminal  
14a Contact surface  
14b Lead part  
15 Switch  
15a Housing  
15b Operating shaft  
15c Lead part  
15 d Front side face

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the connector which can distinguish a kind and the connector with a switch of the cable connected with respect to a connector and a connector with a switch.

[0002]

[Description of the Prior Art] Conventionally, a computer, a digital instrument, or digital instruments may be connected, and data transfer may be performed. In order to perform such data transfer, to a computer. It is allocated in the rear face by the connector as a receptacle, and to a signal cable. The plug allocated in the both ends is inserted in connectors, such as a computer, respectively, a computer, a digital instrument, or digital instruments are connected via a signal cable, and data transfer is performed.

[0003] As such a conventional connector 1 is shown in drawing 12, the housing 2 which has the hollow part 2a which comprises metal etc., and by which the front was opened wide is allocated, and the insulator 4 attached to front sides by insertion molding of the six contact pieces 3 etc. is allocated in the hollow part 2a of this housing 2. The front contact surface 3a has exposed said contact piece 3 in the hollow part 2a.

The back terminal area 3b can be bent by the graphic display lower part, and can be attached now to the mother board etc. which are not illustrated.

Said insulator 4 is fixed by the holding part inside the housing 2 (not shown), and the motion of the terminal area 3b of the contact piece 3 is regulated.

[0004] Although the conventional plug which is inserted in the hollow part 2a of said connector 1, and is connected to the contact piece 3 omits a graphic display, A signal cable is attached to the one side of the insulating member which comprises a resin material, the point of contact which connects with the contact piece 3 of the connector 1 inside is allocated in the insertion

section of the other side, and the peripheral part of the insertion section is covered and formed with the metal plate. By the way, in order for the above connectors 1 to make data transfer possible also among different manufacturing makers in various digital equipment, to attain standardization of data transmission systems is needed. In that case, two or more kinds of signal cables may be prepared in a standard according to a protocol, for example, a transfer rate.

[0005]

[Problem(s) to be Solved by the Invention]However, when giving confusion to an end user when a transfer rate's responds, for example and two or more kinds of signal cables are prepared, and the mistaken signal cable has been connected, a transfer error occurs and the problem that data communications cannot be carried out good is caused. Then, this invention is made in view of such a situation, and the purpose is to provide the connector which can distinguish the kind of signal cable automatically, in order to solve the above evils.

[0006]

[Means for Solving the Problem]As the 1st solving means for solving said technical problem, a connector of this invention, It had a plug allocated by end of a signal cable, and housing which has a connectable terminal inside, and had composition in which a switch applied part which can attach to this housing a switch which can distinguish a kind of said signal cable was formed.

[0007]Said switch applied part considered a connector of this invention as composition which comprises a crevice formed in said some of housing of a side which stands face to face against a front face of said plug inserted in said housing as the 2nd solving means for solving said technical problem.

[0008]Said switch applied part considered a connector of this invention as composition which positions said switch with a wall formed in said housing as the 3rd solving means for solving said technical problem.

[0009]As the 4th solving means for solving said technical problem, a connector with a switch of this invention was provided with a connector claim 1 or 2 or given in three, and considered it as composition which equips said switch applied part with a switch which can distinguish a kind of said signal cable.

[0010]As the 5th solving means for solving said technical problem, a connector with a switch of this invention, Said switch had a suspending portion in some outer walls, it formed an engagement part with which said suspending portion of said switch can engage, made said suspending portion engage with said engagement part, and was used as said said wall which carried out housing formation with composition which equips said switch applied part and regulates movement toward said switch.

[0011]As the 6th solving means for solving said technical problem, a connector with a switch of

this invention formed said account suspending portion in convex, formed said engagement part in a concave of a slot or a hole, and considered it as composition which makes said concave engagement part carry out snap engagement of said convex suspending portion.

[0012]As the 7th solving means for solving said technical problem, a connector with a switch of this invention, Have a cylindrical holddown member and a breakthrough for inserting said holddown member in said wall which constitutes said switch applied part, and said switch is formed, respectively, Where said switch applied part is equipped with said switch, an end part of said holddown member was inserted in said each breakthrough, this end part was projected from said switch, said this projected end part was changed, and it had composition which regulates movement toward said switch with which said switch applied part was equipped.

[0013]As the 8th solving means for solving said technical problem, a connector of this invention, It had a plug allocated by end of a signal cable, and housing which has the insulator which attached a connectable terminal inside, and had composition in which a breakthrough which inserts in an operating shaft of a switch which can distinguish a kind of said signal cable to said insulator which forms said housing was formed.

[0014]As the 9th solving means for solving said technical problem, a connector with a switch of this invention, It had the connector according to claim 8, and where an operating shaft of a switch which can distinguish a kind of said signal cable is inserted in said breakthrough, it had composition which attaches said switch to said housing.

[0015]

[Embodiment of the Invention]The embodiment of a connector with a switch which attached the connector of this invention to below and attached the switch to this connector is described.

Drawing 1 is an exploded perspective view concerning a 1st embodiment of this invention, and drawing 2 is a perspective view of the insulator concerning a 1st embodiment of this invention, Drawing 3 is a perspective view concerning a 1st embodiment of this invention, and drawing 4 is an exploded perspective view concerning a 2nd embodiment of this invention, It is a perspective view of the switch concerning a 3rd embodiment of drawing 5 this invention, drawing 6 is a perspective view concerning a 4th embodiment of this invention, drawing 7 is a perspective view of the insulator concerning a 4th embodiment of this invention, and drawing 8 - drawing 11 are the perspective views of the plug concerning this invention.

[0016]As the connector 11 of the connector 10 with a switch of a 1st embodiment of this invention is shown in drawing 1, the housing 12 with which the peripheral part was covered with the metal plate is allocated, this housing 12 has the oblong opening 12a with an approximately rectangle ahead, and the hollow part 12b is formed in the inside tubed. The graphic display right-hand side of said opening 12a has the unsymmetrical part 12c formed in the approximately trapezoidal shape, and the right and left of the housing 12 are unsymmetrical. A part of back slippage of the housing 12 by the side of said unsymmetrical

part 12c is opened wide, and the crevice 12d is formed.

[0017]In the hollow part 12b of said housing 12, the insulator 13 which comprises a resin material etc. is inserted in a prescribed position, and is allocated. The base 13a of an abbreviated rectangular parallelepiped is formed in the opening [ of the housing 12 ] 12a, and back side of an opposite hand, this insulator 13 is located, and formed protruding of the tabular terminal mounting part 13b is carried out from 13g of front side faces of this base 13a. On the right-hand side of [ graphic display ] said 13 g of front side faces, notching formation of the crevice 13c which comprises the 1st and the 2nd wall 13d and 13e is carried out. If the base 13a of such an insulator 13 is adhered to the prescribed position in the hollow part 12b with adhesives etc., the housing 12 is constituted where the terminal mounting part 13b is located in the approximately center part in the hollow part 12b. And if the insulator 13 is attached to the prescribed position in the hollow part 12b of the housing 12, The switch applied part to which the crevice 13c of the insulator 13 changes from the crevice 12d which can equip with the switch 14 which is located and can distinguish the kind of signal cable mentioned later is formed in the crevice 12b of the housing 12. The switch applied part which comprises said crevice 12d comprises a wall formed in the housing 12 which comprises the wall of the superior lamella 12e and 12 f of inferior lamellas, and the 1st and the 2nd wall 13d and 13e of the insulator 13.

[0018]A total of six terminals 14 are attached to the field of the upper and lower sides of the terminal mounting part 13b of the insulator 13 by insertion molding etc., for example, and the surface contact surface 14a will be exposed. And as for the terminal 14, it lays underground in the base 13a, extended formation is carried out, the lead part 14b at an extended tip is drawn from 13f of rear flanks of the base 13a outside, this lead part 14b is bent by the graphic display lower part, and surface mounting has come be made in reflow soldering at the mother board etc. which are not illustrated.

[0019]In an outside, the housing 15a of an approximately rectangle has the unsymmetrical part 12c of the trapezoidal shape of said housing 12, and 15 f of isomorphism-like inclined planes in the front-face side, and the switch 15 which can distinguish the kind of signal cable with which the crevice 12d which is said switch applied part is equipped, and which was connected to the plug mentioned later is formed. Two switches (not shown), the 1st and the 2nd, are built in the inside of said housing 15a, for example, the operating shaft 15b can swerve to the 1st switch, and the operating shaft 15e can swerve to the 2nd switch, and it projects from the \*\*\*\* housing 15a, and is supported pivotally so that a slide is possible. And the 1st of an inside and the circuit of the 2nd two switch can be turned on and off now by carrying out pressing operation of the operating shafts 15b and 15e of the 2nd switch to the 1st in shaft orientations. The two lead parts 15c are drawn by the graphic display right lateral of said housing 15a, it is connected to two internal switches, respectively, this lead part 15c is, and the portion drawn

outside is bent by the graphic display lower part. Simultaneously with the lead part 14b by the side of the housing 12, surface mounting of said lead part 15c can be carried out now to a mother board (not shown) etc. by reflow soldering.

[0020]In order to attach the switch 15 to the connector 11 which was mentioned above, the operating shafts 15b and 15e of the switch 15 are first inserted in the crevice 12d of the housing 12. Then, when the switch 15 becomes slanting and inserts 15 f of inclined planes of the switch 15 in the unsymmetrical part 12c of the housing 12 from this state, With the wall which comprises the superior lamella 12e of the housing 12, 12 f of inferior lamellas, the unsymmetrical part 12c, and the 1st and the 2nd wall 13d and 13e, the switch 15 is positioned, the slip off stop of the switch 15 is carried out to the crevice 12d which is a switch applied part, and it can be equipped now.

[0021]Such a connector 10 with a switch of a 1st embodiment that attached the switch 15 to the connector 11, As shown in drawing 3, 15 d of front side faces of the housing 15a of the switch 15 turn into the same flat surface as 13 g of front side faces of the base 13a of the insulator 13, The operating shafts 15b and 15e located in the hollow part 12b become the direction of the terminal 14 attached to the insulator 13, and parallel, and the crevice 12d which is a switch applied part can be equipped with the switch 15.

[0022]The connector with a switch of a 2nd embodiment of this invention is explained only about a different portion from the thing explained by a 1st embodiment based on drawing 4. First, the insulator 13 explained by a 1st embodiment is attached in the hollow part 22b to which the connector 21 has the opening 22a in the housing 22. The slot on square or the engagement part 22g formed in the concave of a hole is formed in the wall which comprises the superior lamella 22e which are some walls which constitute the crevice 22d of said housing 22, and 22 f of inferior lamellas. In drawing 4, the hole shows the engagement part 22g. Two switches (not shown), the 1st and the 2nd, are built in, for example, and, as for the switch 25 with which the crevice 22d which is a switch applied part of said connector 21 is equipped, formed protruding of the operating shaft 25b is carried out to the inside of housing 25a from these two switches, respectively. The two lead parts 25c are drawn from the graphic display right side of the housing 25a.

[0023]Formed protruding of the convex suspending portion 25f is carried out to 25 d of upper surfaces and the undersurface 25e of said housing 25a. Such a connector with a switch of a 2nd embodiment of this invention (not shown), If the switch 25 is inserted in the crevice 22d of the housing 22, snap engagement will be carried out at said engagement part 22g, and the up-and-down suspending portion 25f will regulate the movement toward the switch 25 with which the crevice 22d was equipped.

[0024]If a 3rd embodiment of this invention is described based on drawing 5, 1st and 2nd 2 switch (not shown) is built in, for example, and, as for the switch 35, formed protruding of the

operating shaft 35b is carried out to the inside of housing 35a from these two switches, respectively. The two lead parts 35c are drawn from the graphic display right side of the housing 35a. Penetration formation of the breakthrough 35e of an approximately rectangle is carried out at the shaft orientations and the parallel direction of the operating shaft 35b so that the circuit of the internal 1st and the 2nd switch may not be cut into the portion pinched by the two operating shafts 35b of said housing 35a. The cylindrical holddown member 36 is inserted in this breakthrough 35e. said holddown member 36 comprises a resin material, predetermined width and the groove 36b of a depth dimension are formed in the end part 36a, and the other end 36c of this holddown member 36 is formed more broadly than the end part 36a -- a collar - it is \*\*. The breakthrough (not shown) for inserting the holddown member 36 also in the 2nd wall 13e of the insulator 13 which are some walls of the housing 12 explained by a 1st embodiment is formed.

[0025]And equip with the switch 35 the crevice 12d which is a switch applied part, and in the state. The end part 36a of the holddown member 36 is inserted in the breakthrough (not shown) formed in the insulator 13, and the breakthrough 35e formed in the switch 35, The groove 36b of the end part 36a which projected this end part 36a from 35d of front side faces of the switch 35, and was projected from 35d of this front side face, It can be made to crimp and change with a caulking jig (not shown), and the movement toward the switch 35 with which the crevice 12d which is a switch applied part was equipped can be regulated now.

[0026]As shown in drawing 6, the housing 42 which has the insulator 43 inside is allocated, and the switch 45 will be attached the connector 40 with a switch of a 4th embodiment of this invention to the outside behind this housing 42. The switch applied part 42f which can equip with the switch 45 is formed in the outside of 42 g of rear flanks behind said housing 42.

[0027]As shown in drawing 7, the base 43a is formed in a rectangle, the two breakthroughs 43e apply the insulator 43 attached in the hollow part 42b of the housing 42 from 43g of front side faces to 43 f of rear flanks, and penetration formation is carried out in parallel up and down at 43g of front side faces on the right-hand side of [ graphic display ] the terminal mounting part 43b. 1st and 2nd 2 switch (not shown) is built in, for example, and, as for the switch 45, formed protruding of the operating shaft 45b is carried out to the inside of housing 35a from these two switches, respectively. These two operating shafts 45b are formed for a long time than the operating shafts 15b and 15e of the switch 15 explained by a 1st embodiment.

[0028]Such a connector 40 with a switch of a 4th embodiment of composition, Where the two operating shafts 45b of the switch 45 are inserted in the two breakthroughs 43e of the insulator 43 from the rear flank 42g side of the housing 42 so that a slide is possible, the switch 45 is attached to the switch applied part 42f with adhesives etc. Then, after the tip part of the two operating shafts 45b has projected to prescribed dimension front sides from 43g of front side

faces of the insulator 43 of housing 45 inside, the connector 40 with a switch of a 4th embodiment is constituted.

[0029]The plug linked to the connector with a switch of the 1st to 4th above embodiment of this invention, in order to receive the efficiency of data transfer, corresponding to the highest data transfer rate, the length of a signal cable differs and the 1st to 4th four kinds of plug is prepared in an order from the longer one of this signal cable. The 1st to 4th four kinds of this plug is explained based on drawing 8 - drawing 11.

[0030]First, as shown in drawing 8, the 1st plug 16 allocated by the end of the signal cable 16b has the insulating member 16a which comprises a resin material, and the signal cable 16b long No. 1 is connected to the one side of this insulating member 16a, for example in four kinds of plugs. The opening 16e linked to the contact surface 14a of the terminal 14 of the connector 11 which has a point of contact (not shown) inside is formed in the front wall 16d of the insertion section 16c of the other side of said insulating member 16a in a predetermined size and depth, and the peripheral part of the insertion section 16c is covered with it with the metal plate 16f. If this metal plate 16f inserts the 1st plug 16 in the connector 11 and connects, the contact segment (not shown) of the metallic housing 12 will contact, and it will flow. In order to prevent incorrect-inserting said insertion section 16c when inserting the plug 16 in the connector 11 of a 1st embodiment, for example, the graphic display left-hand side of the front wall 16d is formed in the unsymmetrical part 12c of the housing 12, and the isomorphism-like approximately trapezoidal shape.

[0031]Since the front wall 16d of the insertion section 16c is formed in the shape of [ without a level difference ] flatness, the 1st plug 16 of such composition, If the plug 16 is inserted in the connector 11 of a 1st embodiment, for example and it connects, 16 d of front side faces of the trapezoidal shape on the left-hand side of a graphic display press the 1st of the switch 15, and the operating shafts 15b and 15e of the 2nd switch, and turn on the 1st and the 2nd switch simultaneously. It detects automatically that the 1st plug 16 to which the control section (not shown) by the side of devices, such as a printer, has a signal cable long No. 1, for example was connected to the connector 11 because the 1st of said switch 15 and the 2nd switch (not shown) turn on.

[0032]The 2nd plug 17 allocated by the end of the signal cable 17b as shown in drawing 9, The long signal cable 17b is connected to the 2nd, for example in four kinds of plugs, the opening 17e is formed and the peripheral part of the insertion section 17c is covered with the front wall 17d of the insertion section 17c of the other side with the metal plate 17f at the one side of the insulating member 17a. Notching of the upper part half of the corner part of the trapezoidal shape on the left-hand side of [ graphic display ] the front wall 17d of said insertion section 17c is carried out with a prescribed dimension, and the notch section 17g is formed.

[0033]Therefore, if the 2nd plug 17 is inserted in the connector 11 of a 1st embodiment, for

example and it connects, The operating shaft 15b of the 1st switch of the switch 15 is located in said notch section 17g, it is not pressed, but only the operating shaft 15e of the 2nd switch is pressed with the front wall 17d, and only the 2nd switch turns on the operating shaft 15b. The 2nd plug 17 to which the control section (not shown) by the side of a device has a long signal cable in the 2nd detects having been connected to the connector 11 automatically because this 2nd switch turns on.

[0034]The 3rd plug 18 allocated by the end of the signal cable 18b as shown in drawing 10, The long signal cable 18b is connected to the 3rd, for example in four kinds of plugs, the opening 18e is formed and the peripheral part of the insertion section 18c is covered with the front wall 18d of the insertion section 18c of the other side with the metal plate 18f at the one side of the insulating member 18a. Notching of the bottom half of the corner part of the trapezoidal shape on the left-hand side of [ graphic display ] 18 d of front side faces of said insertion section 18c is carried out with a prescribed dimension, and the notch section 18g is formed.

[0035]Therefore, if the 3rd plug 18 is inserted in the connector 11 of a 1st embodiment, for example and it connects, The operating shaft 15e of the 2nd switch of the switch 15 is located in said notch section 18g, it is not pressed, but the operating shaft 15b of the 1st switch is pressed with the front wall 18d, and only the 1st switch turns on the operating shaft 15e. It detects automatically that the 3rd plug 18 to which the control section (not shown) by the side of a device has a long signal cable in the 3rd was connected to the connector 11 because this 1st switch turns on.

[0036]The 4th plug 19 allocated by the end of the signal cable 19b as shown in drawing 11, The long (the shortest in four kinds) signal cable 19b is connected to the 4th, for example in four kinds of plugs, the opening 19e is formed and the peripheral part of the insertion section 19c is covered with the front wall 19d of the insertion section 19c of the other side with the metal plate 19f at the one side of the insulating member 19a. Notching of the corner part of the trapezoidal shape on the left-hand side of [ graphic display ] the front wall 19d of said insertion section 19c is carried out to the graphic display upper and lower sides, and the notch section 19g is formed.

[0037]Therefore, if the 4th plug 19 is inserted in the connector 11 of a 1st embodiment, for example and it connects, The 1st and the 2nd switch are not turned on without locating the operating shafts 15b and 15e of the 1st and the 2nd SWITCH of the switch 15 in said notch section 19g and pressing the two operating shafts 15b and 15e. By two switches, the 1st and the 2nd, not being turned on although said 4th plug 19 was inserted and connected to the connector 11. It can detect now automatically that the plug 19 to which the control section (not shown) by the side of a device has the long (the shortest in four kinds) signal cable 19b in the 4th was connected to the connector 11.



[0038]the [ the 1st which was mentioned above - ] – the relation between four kinds of plugs of four, the 1st of the switch 15, operation of the 2nd switch, and the highest data transfer rate of a signal cable is shown in Table 1. In this example, the length of a signal cable becomes short at the order of the 1st - the 4th plug, and a data transfer rate becomes early.

[Table 1]

	第1のSW	第2のSW	信号ケーブルの種類	
			長さ	最高データ転送速度
第1のプラグ	ON	ON	1番	400Mbps
第2のプラグ	OFF	ON	2番	800Mbps
第3のプラグ	ON	OFF	3番	1600Mbps
第4のプラグ	OFF	OFF	4番	3200Mbps

[0039]Although the thing constituted from a wall which comprises the superior lamella of housing, an inferior lamella, the unsymmetrical part 12c of the housing 12, and two walls formed in the insulator, and which was formed in housing explained the crevice which is switch wearing in explanation of the 1st - a 3rd embodiment of this invention, The thing which formed the crevice with the wall which formed the housing which comprises a metal plate in two walls formed in the insulator by end bending etc. may be sufficient. Although the thing having two switches, the 1st and the 2nd, explained the switch used for the connector with a switch of this invention, corresponding to the kind of signal cable, what changed the number of the switches to build in may be used. The 1st and the 2nd switch may not be limited to the thing built in the housing, but what equipped the switch applied part with the switch of the Bala-like item may be used for them, respectively.

[0040]

[Effect of the Invention]The connector of this invention is provided with the plug allocated by the end of the signal cable, and the housing which has a connectable terminal inside, Since the switch applied part which can attach the switch which can distinguish the kind of said signal cable in this housing was formed, the good connector of the assembly nature which can equip this switch applied part with a switch easily can be provided.

[0041]Said switch applied part of the connector of this invention, Since the crevice formed in said some of housing of the side which stands face to face against the front face of said plug inserted in said housing is comprised, it is press working of sheet metal etc. about housing, and a crevice can be easily formed for an internal insulator by a molding process etc., and the easy connector of processing can be provided.

[0042]Since said switch applied part of the connector of this invention was made to position said switch with the wall formed in said housing, it can make high positioning accuracy of the switch attached to the switch applied part which comprises a crevice.

[0043]Since the connector with a switch of this invention is provided with a connector claim 1 or 2 or given in three and said switch applied part was equipped with the switch which can distinguish the kind of said signal cable, With the switch with which the switch applied part was equipped, the kind of signal cable can be distinguished automatically, and can be detected, and the connector with a switch which can distinguish the kind of signal cable certainly rightly can be provided. A switch applied part can be easily equipped with SWITCH, and positioning accuracy of the switch attached to the switch applied part can be made high.

[0044]Said switch attached to the connector with a switch of this invention, Have a suspending portion in some outer walls, and in said said wall which carried out housing formation. Since form the engagement part with which said suspending portion of said switch can engage, said suspending portion is made to engage with said engagement part, said switch applied part is equipped and the movement toward said switch was regulated, A switch can be certainly stopped to a connector and it can fix, and even if vibration etc. are added to the connector which stopped the switch, the connector with a switch from which a switch does not separate can be provided.

[0045]Since the connector with a switch of this invention forms said suspending portion in convex, said engagement part is formed in the concave of a slot or a hole and it was made to make said concave engagement part carry out snap engagement of said convex suspending portion, A switch can be manually etc. stopped to a connector easily by one-touch, it can fix, and the good connector with a switch of assembly nature can be provided.

[0046]The connector with a switch of this invention is provided with a cylindrical holddown member, and the breakthrough for inserting said holddown member in said wall which constitutes said switch applied part, and said switch is formed, respectively, Where said switch applied part is equipped with said switch, the end part of said holddown member is inserted in said each breakthrough, This end part is projected from said switch, and said this projected end part is changed, and since the movement toward said switch with which said switch applied part was equipped was regulated, a switch can be certainly stopped to a connector and it can fix.

[0047]The connector of this invention is provided with the plug allocated by the end of the signal cable, and the housing which has the insulator which attached the connectable terminal inside, Since the breakthrough which inserts in the operating shaft of the switch which can distinguish the kind of said signal cable to said insulator which forms said housing was formed, the connector which can equip housing with a switch can be provided by inserting the operating shaft of a switch in this breakthrough.

[0048]It is in the state which the connector with a switch of this invention was provided with the connector according to claim 8, and inserted in said breakthrough the operating shaft of the switch which can distinguish the kind of said signal cable, Since said switch was attached to

said housing, the good connector with a switch of assembly nature can be provided.

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[Translation done.]

\* NOTICES \*

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CLAIMS

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[Claim(s)]

[Claim 1]A connector forming a switch applied part which can be provided with a plug allocated by end of a signal cable, and housing which has a connectable terminal inside, and can attach to this housing a switch which can distinguish a kind of said signal cable.

[Claim 2]The connector according to claim 1, wherein said switch applied part comprises a crevice formed in said some of housing of a side which stands face to face against a front face of said plug inserted in said housing.

[Claim 3]Claim 1, wherein said switch applied part positions said switch with a wall formed in said housing, or a connector given in two.

[Claim 4]A connector with a switch having a connector claim 1 or 2 or given in three, and equipping said switch applied part with a switch which can distinguish a kind of said signal cable.

[Claim 5]Have said switch in some outer walls, and a suspending portion in said said wall which carried out housing formation. The connector with a switch according to claim 4 forming an engagement part with which said suspending portion of said switch can engage, making said suspending portion engage with said engagement part, equipping said switch applied part, and regulating movement toward said switch.

[Claim 6]The connector with a switch according to claim 5 characterized by forming said suspending portion in convex, forming said engagement part in a concave of a slot or a hole, and making it make said concave engagement part carry out snap engagement of said convex suspending portion.

[Claim 7]Have a cylindrical holddown member and a breakthrough for inserting said holddown member in said wall which constitutes said switch applied part, and said switch is formed, respectively, Where said switch applied part is equipped with said switch, an end part of said holddown member is inserted in said each breakthrough, The connector with a switch

according to claim 4 regulating movement toward said switch which projected this end part from said switch, and was made to change said this projected end part, and with which said switch applied part was equipped.

[Claim 8]A connector forming a breakthrough which inserts in an operating shaft of a switch which can distinguish a kind of said signal cable to said insulator which is provided with a plug allocated by end of a signal cable, and housing which has the insulator which attached a connectable terminal inside, and forms said housing.

[Claim 9]A connector with a switch characterized by attaching said switch to said housing where it had the connector according to claim 8 and an operating shaft of a switch which can distinguish a kind of said signal cable is inserted in said breakthrough.

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## EFFECT OF THE INVENTION

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[Effect of the Invention] The connector of this invention is provided with the plug allocated by the end of the signal cable, and the housing which has a connectable terminal inside. Since the switch applied part which can attach the switch which can distinguish the kind of said signal cable in this housing was formed, the good connector of the assembly nature which can equip this switch applied part with a switch easily can be provided.

[0041] Said switch applied part of the connector of this invention, Since the crevice formed in said some of housing of the side which stands face to face against the front face of said plug inserted in said housing is comprised, it is press working of sheet metal etc. about housing, and a crevice can be easily formed for an internal insulator by a molding process etc., and the easy connector of processing can be provided.

[0042] Since said switch applied part of the connector of this invention was made to position said switch with the wall formed in said housing, it can make high positioning accuracy of the switch attached to the switch applied part which comprises a crevice.

[0043] Since the connector with a switch of this invention is provided with a connector claim 1 or 2 or given in three and said switch applied part was equipped with the switch which can distinguish the kind of said signal cable, With the switch with which the switch applied part was equipped, the kind of signal cable can be distinguished automatically, and can be detected, and the connector with a switch which can distinguish the kind of signal cable certainly rightly can be provided. A switch applied part can be easily equipped with SWITCH, and positioning accuracy of the switch attached to the switch applied part can be made high.

[0044] Said switch attached to the connector with a switch of this invention, Have a suspending portion in some outer walls, and in said said wall which carried out housing formation. Since form the engagement part with which said suspending portion of said switch can engage, said suspending portion is made to engage with said engagement part, said switch applied part is equipped and the movement toward said switch was regulated, A switch can be certainly

stopped to a connector and it can fix, and even if vibration etc. are added to the connector which stopped the switch, the connector with a switch from which a switch does not separate can be provided.

[0045] Since the connector with a switch of this invention forms said suspending portion in convex, said engagement part is formed in the concave of a slot or a hole and it was made to make said concave engagement part carry out snap engagement of said convex suspending portion, A switch can be manually etc. stopped to a connector easily by one-touch, it can fix, and the good connector with a switch of assembly nature can be provided.

[0046] The connector with a switch of this invention is provided with a cylindrical holddown member, and the breakthrough for inserting said holddown member in said wall which constitutes said switch applied part, and said switch is formed, respectively, Where said switch applied part is equipped with said switch, the end part of said holddown member is inserted in said each breakthrough, This end part is projected from said switch, and said this projected end part is changed, and since the movement toward said switch with which said switch applied part was equipped was regulated, a switch can be certainly stopped to a connector and it can fix.

[0047] The connector of this invention is provided with the plug allocated by the end of the signal cable, and the housing which has the insulator which attached the connectable terminal inside, Since the breakthrough which inserts in the operating shaft of the switch which can distinguish the kind of said signal cable to said insulator which forms said housing was formed, the connector which can equip housing with a switch can be provided by inserting the operating shaft of a switch in this breakthrough.

[0048] It is in the state which the connector with a switch of this invention was provided with the connector according to claim 8, and inserted in said breakthrough the operating shaft of the switch which can distinguish the kind of said signal cable, Since said switch was attached to said housing, the good connector with a switch of assembly nature can be provided.

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[Translation done.]